apparatus having an RF amplifier comprising

WHAT IS CLAIMED IS:

1. A base station ~~suitable for use in a multi-carrier mobile communication system, which is~~ equipped with an RF amplifier comprising:

input ports for inputting a plurality of input signals different in frequency of carrier from one another;

dividers for respectively dividing each of the plurality of input signals inputted to the input ports into plural form;

phase shifters for respectively assigning a weight of phase to each of divided signals corresponding to a number obtained by subtracting 1 from the number of divisions;

a plurality of first combiners for respectively adding up the signals different in the frequency of carrier, out of the divided signals and signals each assigned the weight of phase;

a plurality of amplifiers for respectively amplifying signals outputted from the plurality of first combiners; and

a second combiner for adding signals outputted from the plurality of amplifiers to output one signal.

2. A base station according to claim 1, wherein the first combiners and the second combiners are respectively directional couplers.

3. A base station according to claim 1, wherein the phase shifters are defined as first variable phase shifters, and

first variable attenuators are respectively connected to output ports of the dividers, thereby connections of the first variable phase shifters to the output ports of the dividers are established via the first variable attenuators, a second variable attenuator is inserted between one predetermined first combiner and the power amplifier and a second variable attenuator and a second variable phase shifter are inserted in series between the other first combiner and the power amplifier, a directional coupler is inserted between the second combiner and the output port, and further including a control circuit for adjusting the first and second variable attenuators and the first and second variable phase shifters by using a signal outputted from the directional coupler.

4. A base station according to claim 1, wherein a respective one of the input ports has a respective one of the plurality of input signals different in frequency of carrier from one another input thereto, and the RF amplifier enables suppression of generation of spurious signals when the plurality of input signals are simultaneously applied thereto.

5. A base station suitable for use in a multi-carrier mobile communication system, which is equipped with an RF amplifier comprising:

s outer input ports for respectively inputting each of s (where s: integer greater than or equal to 2) signals different

in frequency of carrier from one another;

s 1:m dividers respectively connected to each of the s outer input ports and for respectively dividing each of the input signals into m (where m: integer greater than or equal to 2);

s × (m-1) phase shifters respectively connected to each from second output ports of the s dividers to mth output ports thereof;

s m:1 first combiners for respectively inputting m output signals selected from s output signals sent from first output ports of the s dividers and s × (m-1) output signals of the s dividers sent via the phase shifters and combining the m output signals into one;

s power amplifiers substantially identical in characteristic, for respectively amplifying an output signal of each of the s first combiners; and

an s:1 second combiner for inputting output signals of the s power amplifiers and combining the output signals thereof into one, and outputting the combined signal to an outer output port,

wherein the m output signals inputted to each of the first combiners are different in frequency of carrier from one another, and the s × m output signals inputted to the s first combiners are different from one another.

6. A base station according to claim 5, wherein a phase

amount of each of the phase shifters is a substantially integral multiple of 120°/m, and phase amounts of the phase shifters connected to the same divider are different from one another.

7. A base station according to claim 6, wherein a phase of the output signal sent from the first output port of each of the dividers and phases of the output signals sent from the second output port thereof to the mth output port thereof via the respective phase shifters thereof are respectively (120°/m) × k, k = -1, 0, 1, … (m-2).

8. A base station according to claim 5, wherein the first combiners and the second combiners are respectively directional couplers.

9. A base station according to claim 5, wherein the phase shifters are defined as first variable phase shifters, and first variable attenuators are respectively connected to output ports of the dividers, thereby connections of the first variable phase shifters to the output ports of the dividers are established via the first variable attenuators, a second variable attenuator is inserted between one predetermined first combiner and the power amplifier and a second variable attenuator and a second variable phase shifter are inserted in series between the other first combiner and the power

amplifier, a directional coupler is inserted between the second combiner and the output port, and further including a control circuit for adjusting the first and second variable attenuators and the first and second variable phase shifters by using a signal outputted from the directional coupler.

10. A base station suitable for use in a multi-carrier mobile communication system, which is equipped with an RF amplifier comprising:

s outer input ports for respectively inputting each of s (where s: integer greater than or equal to 2) signals different in frequency of carrier from one another;

s 1:2n dividers respectively connected to each of the s outer input ports and for respectively dividing each of the input signals into 2n (where n: positive integer);

s × (2n-1) phase shifters respectively connected to each from second output ports of the s dividers to 2nth output ports thereof;

sn 2:1 first combiners for respectively inputting two output signals selected from s output signals sent from first output ports of the s dividers and s × (2n-1) output signals of the s dividers sent via the phase shifters and combining the two output signals into one;

sn power amplifiers substantially identical in characteristic, for respectively amplifying an output signal of each of the sn first combiners; and

an sn:1 second combiner for inputting output signals of the sn power amplifiers and combining the output signals thereof into one, and outputting the combined signal to an outer output port,

wherein the two output signals inputted to each of the first combiners are different in frequency of carrier from one another, and the sn × 2 output signals inputted to the sn first combiners are different from one another.

11. A base station according to claim 10, wherein a phase amount of each of the phase shifters is a substantially integral multiple of 120°/2n, and phase amounts of the phase shifters connected to the same divider are different from one another.

12. A base station according to claim 11, wherein a phase of the output signal sent from the first output port of each of the dividers and phases of the output signals sent from the second output port thereof to the mth output port thereof via the respective phase shifters thereof are respectively $(120°/2n) \times k$, $k = -1, 0, 1, \ldots (2n-2)$.

13. A base station according to claim 10, wherein the first combiners and the second combiners are respectively directional couplers.

14. A base station according to claim 10, wherein the phase shifters are defined as first variable phase shifters, and first variable attenuators are respectively connected to output ports of the dividers, thereby connections of the first variable phase shifters to the output ports of the dividers are established via the first variable attenuators, a second variable attenuator is inserted between one predetermined first combiner and the power amplifier and a second variable attenuator and a second variable phase shifter are inserted in series between the other first combiner and the power amplifier, a directional coupler is inserted between the second combiner and the output port, and further including a control circuit for adjusting the first and second variable attenuators and the first and second variable phase shifters by using a signal outputted from the directional coupler.